

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1 and 3-15 are presently pending in this application, Claims 6-12 having been withdrawn from further consideration by the Examiner, Claim 2 having been canceled, Claims 1, 3 and 15 having been amended by the present amendment.

In the outstanding Office Action, Claims 2 and 3 were objected to for improper dependency; Claims 1-5 and 13-15 were rejected under 35 U.S.C. §112, first paragraph, as containing subject matter not enabling to one skilled in the relevant art; Claims 1-5 and 13-15 were rejected under 35 U.S.C. §112, second paragraph, for being indefinite; Claims 1, 2 and 15 were rejected under 35 U.S.C. §102(b) as being anticipated by Efferding (U.S. Patent 4,800,283); Claims 1, 2 and 15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Wells et al. (U.S. Patent 4,827,139) in view of either one of Efferding or DE 2835392 (hereinafter “DE ’392”); and Claims 3-5, 13 and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over either one of the Wells-Efferding combination or the Wells- DE’392 combination further in view of Horning (U.S. Patent 3,036,964) and Mogard (U.S. Patent 4,004,972).

With regard to the objection and the rejections under 35 U.S.C. §112, in the claims, Claims 1, 3 and 15 have been amended and Claim 2 has been canceled, and thus these objection and rejections are believed to be overcome. If, however, the Examiner disagrees, the Examiner is invited to telephone the undersigned who will be happy to work in a joint effort to derive mutually satisfactory claim language.

Furthermore, Claims 1 and 15 have been amended herein. These amendments find support on, for example, page 24, line 20, to page 41, line 11, of the specification. Hence, no new matter is believed to be added thereby.

Briefly, Claim 1 of the present invention is directed to a cask including a basket including a plurality of rectangular plate members capable of absorbing neutrons and alternately plied up vertically, the members each having a plurality of cutting sections for mutually plurality engaging the plurality of rectangular plate members, the rectangular plate members forming a plurality of cells each configured to hold a spent fuel assembly, the basket having a cross section having a plurality of stepped corners, a barrel main body having a unitary construction which shields γ rays and has an inner cavity having a shape corresponding to an outer shape of the basket such that the barrel main body and the basket are substantially in close contact with each other, and a neutron shielding body provided in an outer periphery of the barrel main body. By providing such a barrel main body, the number of cells to be inserted in the cask can be increased, while the mass of the barrel main body can be decreased without increasing the size of the cask. At the same time, the ability to shield γ ray and neutron is maintained. Furthermore, the heat conductivity between the basket and barrel main body is improved since the contacting area between the basket and the barrel main body is increased. In addition, the barrel main body is more compact, because unnecessary space within the cavity can be reduced,¹ and a stress is dispersed more uniformly, because the barrel main body can have more uniform thickness.²

Efferding discloses a cask. However, it is respectfully submitted that Efferding does not teach “a barrel main body having a unitary construction which shields γ rays and has an inner cavity having a shape corresponding to an outer shape of the basket such that the barrel main body and the basket are substantially in close contact with each other” as recited in amended Claim 1. According to Efferding, the circular former plates 7a-7j forming the “barrel main body” each have the stepped inner edge 27 which is generally complementary in

¹ Specification, page 7, lines 2-4.

² Id., page 17, lines 10-11.

shape to the exterior perimeter of the cell assembly 4, i.e., the “basket.”³ Efferding further discloses that the inner perimeter 27 of each former plate 7a-7j includes a plurality of angular cut-out portions 34a-34h.⁴ These cut-out portions 34a-34h serve three functions: First, they simplify the installation of the former plates 7a-7j around the basket structure; second, they reduce the weight of the former plates 7a-7j; and third, they compliment the shock-absorbing functions of the portions 29a-29p by mechanically focusing major contact points between the wall of the cell assembly 4 and the inner perimeter 27 of the former plates 7a-7j into one of the shock absorbing portions 29a-29p.⁵ Thus, as seen from Figures 2 and 3, there is significantly large space between the “barrel main body” and basket at the cut-out portions. Moreover, according to Efferding, each of the former plates have the shock-absorbing portions formed of a plurality of holes and the “barrel main body” is formed by stacking the plurality of the former plates. As such, Efferding clearly does not teach the “barrel main body having a unitary construction” as recited in Claim 1. Consequently, the Efferding barrel main body is believed to have a lower thermal conduction efficiency than the barrel main body recited in Claim 1. Furthermore, the holes provided suggest that the Efferding structure has a lower gamma ray shielding capability than the structure recited in Claim 1. Therefore, it is respectfully submitted that the structure recited in amended Claim 1 is believed to be patentably distinguishable from Efferding and thus is not anticipated thereby.

Wells et al. also disclose a cask, and the outstanding Office Action asserts that the combination of the filler blocks 42, the rings 34, 36, and the space 28 taught by Wells et al. is equivalent to the barrel main body as recited in Claim 1. However, Wells et al. fail to teach “a barrel main body having a unitary construction which shields γ rays and has an inner cavity having a shape corresponding to an outer shape of the basket such that the barrel main

³ Efferding, column 4, lines 42-44, and Figure 3.

⁴ See id., Figure 2 and column 4, line 66, to column 5, line 12.

⁵ See id., Figure 3.

body and the basket are substantially in close contact with each other” as recited in amended Claim 1. On the other hand, according to Wells et al., the filler blocks 42 are made of a neutron poisoning material such as an alloy of aluminum and boron,⁶ the rings 34, 36 are made of steel,⁷ and the space 38 is filled with lead for blocking gamma radiation.⁸ Also, Wells et al. disclose that where various stresses are exerted, it is better to have these structural elements independent of each other, rather than unitary,⁹ and the thermal conduction efficiency of the Wells et al. elements would be significantly lowered compared to that of the barrel main body having a unitary construction as recited in Claim 1. In addition, since Wells et al. would be required to manufacture the “barrel main body” assembled from independent components made of different materials, the structure and manufacturing process of the Wells et al. barrel main body would be more complicated than the structure recited in Claim 1. Therefore, it is respectfully submitted that the structure recited in amended Claim 1 is also believed to be patentably distinguishable from Wells et al., and thus is not anticipated thereby.

Horning, Mogard and DE ‘392 disclose a nuclear reactor apparatus, a nuclear fuel element and a storage frame for nuclear reactor fuel elements, respectively, but do not teach “a barrel main body having a unitary construction which shields γ rays and has an inner cavity having a shape corresponding to an outer shape of the basket such that the barrel main body and the basket are substantially in close contact with each other” as recited in amended Claim 1. Horning discloses a nuclear reactor having a substantial space between the barrel main body and the cells composing the basket, i.e., the shape of the cavity does not correspond with the outer shape of the basket,¹⁰ Mogard simply discloses the cladding tube 1 for the nuclear fuel pellets 3, and DE ‘392 only discloses a storage frame made of intersecting

⁶ See Wells et al., column 4, lines 35-37.

⁷ See id., column 4, line 2.

⁸ See id., column 4, lines 14-16.

⁹ See id., column 4, lines 52-56.

¹⁰ See Horning, Figure 1.

pairs of sheets with slot joints at intersections. Hence, the structure recited in Claim 1 is also believed to be distinguishable from Horning, Mogard and DE '392.

Because none of Efferding, Wells et al., Horning, Mogard and DE '392 discloses the barrel main body as recited in Claim 1, even the combined teachings of these cited references are not believed to render the structure recited in Claim 1 as amended obvious. Furthermore, because Claims 3 and 15 have been amended to include subject matter substantially similar to what is recited in Claim 1 to the extent of the above discussions, Claims 3 and 15 are believed to be patentably distinguishable from Efferding, Wells et al., Horning, Mogard and DE '392.

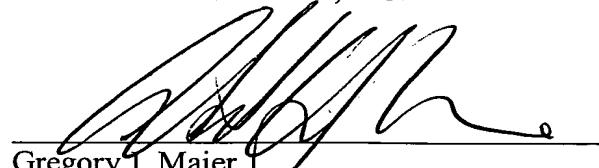
For the foregoing reasons, Claims 1, 3 and 15 are believed to be allowable. Furthermore, since Claims 4-5 and 13-14 ultimately depend from Claim 1, substantially the same arguments set forth above also apply to these dependent claims. Hence, Claims 4-5 and 13-14 are believed to be allowable as well.

Application No. 10/080,709
Reply to Office Action of March 7, 2003

In view of the amendments and discussions presented above, Applicants respectfully submit that the present application is in condition for allowance, and an early action favorable to that effect is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Gregory J. Maier
Attorney of Record
Registration No. 25,599



22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
GJM/AY:fm
I:\ATTY\AKY\21s\219973\AME 3 MODIFIED.DOC

Akihiro Yamazaki
Registration No. 46,155